CLAIMS

1. A mobile communication system which comprises a mobile station (MS) and an interworking function (IWF) for establishing a high-speed point-to-point data connection to a data network access point (2), which supports a multilink point-to-point protocol PPP, said point-to-point connection comprising a first subleg between the mobile station (MS) and the interworking function (IWF) and a second multilink PPP subleg between the interworking function (IWF) and the access point (2), **characterized** in that

the mobile station (MS) comprises multilink PPP protocol means (4, 6) for establishing at least two PPP links (PPP1, PPPn) with said access point (2) through said point-to-point connection,

said first subleg comprises at least two PPP subchannels for transferring each of said at least two PPP links (PPP1, PPPn) in a dedicated PPP subchannel,

the interworking function (IWF) is arranged to adapt each PPP subchannel to the respective PPP link (PPP1, PPPn) on said multilink PPP connection so that the PPP links are transferred transparently between the multilink protocol means of the mobile station and the access point (2).

2. A mobile communication system according to claim 1, **characterized** in that on said first subleg there is a physically separate traffic channel or traffic stream for each PPP link (PPP1, PPPn).

3. A mobile communication system according to claim 1, **characterized** in that a link access control protocol, such as a radio link protocol RLP, is used on said first subleg or on one of its subsegments, and that there is a separate LAC link and a physically separate traffic channel or traffic stream for each PPP link (PPP1, PPPn) between the mobile station (MS) and the interworking function (IWF) or on said subsegment.

4. A mobile communication system according to claim 1, **characterized** in that there is one common broadband traffic channel for all PPP links (PPP1, PPPn) on said first subleg, and that the mobile station (MS) and the interworking function (IWF) are arranged to multiplex the PPP links (PPP1, PPPn) into said broadband traffic channel.

5. A mobile communication system according to claim 1, **characterized** in that there is a separate LAC protocol link for each PPP link (PPP1, PPPn) and one common broadband traffic channel for all

PPP links (PPP1, PPPn) on said first subleg or on one of its subsegments, and that the mobile station (MS) and the interworking function (IWF) are arranged to multiplex the PPP links (PPP1, PPPn) into said broadband traffic channel.

6. A mobile communication system according to claim 4 ~~or 5~~, **characterized** in that the mobile station (MS) and the interworking function (IWF) are arranged to multiplex the PPP links (PPP1, PPPn) into the frame structure of the broadband traffic channel.

7. A mobile communication system according to claim 6, **characterized** in that each PPP link (PPP1, PPPn) has predetermined bit locations in the transmission frame of the broadband traffic channel.

8. A mobile communication system according to claim 6, **characterized** in that the mobile station (MS) and the interworking function (IWF) or an intermediate network element are arranged to multiplex the frames of each separate LAC protocol link into said broadband traffic channel.

9. A mobile communication system according to claim 1, **characterized** in that there is one common LAC protocol link for all PPP links (PPP1, PPPn) on said first subleg or on one of its subsegments, and PPP subchannels are multiplexed inside the LAC protocol link.

10. A mobile communication system according to claim 9, **characterized** in that each frame of the LAC protocol link contains information from each PPP link (PPP1, PPPn).

11. A mobile communication system according to claim 9, **characterized** in that each frame of the LAC protocol link contains information from only one PPP link (PPP1, PPPn) and information on the PPP link to which the information is related.

12. A mobile communication system according to ~~any one of claims 9 to 11~~ claim 9, **characterized** in that there is one common broadband traffic channel between the mobile station and the interworking function.

13. A mobile communication system according to ~~any one of claims 9 to 11~~ claim 9, **characterized** in that a traffic channel underlying said common LAC protocol link on said first subleg or on one of its subsegments consists of two or more sub-traffic channels.

14. A mobile communication system according to ~~any one of claims 2 to 13~~ claim 1, **characterized** in that said subsegment is located between the

mobile station and a network element of the radio access network, preferably a radio network controller.

15. A mobile station for a mobile communication system, the mobile station comprising means for establishing a high-speed point-to-point data connection to a data network access point (2), which supports a multilink point-to-point protocol PPP, said point-to-point connection comprising a first subleg and a second multilink PPP subleg and an interworking function (IWF) between the sublegs, **characterized** in that the mobile station (MS) also comprises

multilink PPP protocol means (4, 6) for establishing at least two PPP links (PPP1, PPPn) with said access point (2) through said point-to-point connection,

means (71, 73, 83, 91) for inserting said at least two PPP links (PPP1, PPPn) into two or more PPP subchannels whose number corresponds to that of the PPP links for transferring each PPP link in a dedicated PPP subchannel on said first subleg.

16. A mobile station according to claim 15, **characterized** in that the mobile station (MS) comprises means for establishing a physically separate traffic channel or traffic stream for each PPP subchannel on said first subleg.

17. A mobile station according to claim 15, **characterized** in that a link access control protocol of the mobile communication network, such as a radio link protocol RPL, is used on said first subleg or on one of its subsegments, and that the mobile station (MS) comprises means (71, 73) for establishing a separate LAC link and a physically separate traffic channel or traffic stream for each PPP subchannel on said first subleg or on its subsegment.

18. A mobile station according to claim 15, **characterized** in that the mobile station (MS) comprises means (83) for multiplexing PPP links into a common broadband traffic channel.

19. A mobile station according to claim 15, **characterized** in that the mobile station (MS) comprises means (81) for establishing a separate LAC protocol link for each PPP link (PPP1, PPPn) via one common broadband traffic channel and means (83) for multiplexing PPP links into said broadband traffic channel.

20. A mobile station according to claim 15, **characterized** in that the mobile station (MS) comprises means (93) for establishing one common LAC protocol link for all PPP links (PPP1, PPPn) and means (91) for multiplexing PPP subchannels inside the LAC protocol link.

21. An interworking function for a mobile communication network, the interworking function comprising means for establishing a high-speed point-to-point data connection between a data network access point (2), which supports a multilink point-to-point protocol PPP and a mobile station (MS), said point-to-point connection comprising a first subleg between the mobile station (MS) and the interworking function (IWF) and a second multilink PPP subleg between the interworking function (IWF) and the access point (2), **characterized** in that the interworking function (IWF) comprises

means (72, 74, 84, 92) for inserting PPP links (PPP1, PPPn) of the multilink PPP subleg into a corresponding number of PPP subchannels on said first subleg for transferring each PPP link in a dedicated PPP subchannel so that the PPP links are transferred transparently through the mobile communication network between the mobile station (MS) and the access point (2).

22. An interworking function according to claim 21, **characterized** in that a link access control protocol of the mobile communication network, such as a radio link protocol RLP, is used on said first subleg or on one of its subsegments, and that the interworking function (IWF) comprises means (72, 74) for establishing a separate LAC link and a physically separate traffic channel or traffic stream for each PPP subchannel on said first subleg or on its subsegment.

23. An interworking function according to claim 21, **characterized** in that the interworking function (IWF) comprises means (82) for establishing a separate LAC protocol link for each PPP link (PPP1, PPPn) via one common broadband traffic channel and means (84) for multiplexing PPP links into said broadband traffic channel.

24. An interworking function (IWF) according to claim 21, **characterized** in that the interworking function (IWF) comprises means (94) for establishing one common LAC protocol link for all PPP links (PPP1, PPPn) and means (92) for multiplexing PPP subchannels inside the LAC protocol link.

25. A method of establishing a high-speed point-to-point data connection, the method comprising the steps of

establishing a first subleg between a mobile station and an interworking function in a mobile communication network,

establishing a second subleg between the interworking function and another party,

characterized in that the method also comprises the steps of

establishing a multilink point-to-point connection between the mobile station and the other party,

dividing the subleg between the mobile station and the interworking function into subchannels,

transferring each link of the multilink point-to-point connection in a dedicated subchannel on the subleg between the mobile station and the interworking function.

26. A method according to claim 25, **characterized** by

establishing a physically separate traffic channel or traffic stream for each link of the multilink point-to-point connection on the subleg between the mobile station and the interworking function,

establishing a separate link access control (LAC) protocol link, such as a radio link protocol (RLP) link, for each link of the multilink point-to-point connection on the subleg between the mobile station and the interworking function or on one of its subsegments.

27. A method according to claim 25, **characterized** by

establishing a separate link access control (LAC) protocol link, such as a radio link protocol (RLP) link, for each link of the multilink point-to-point connection on the subleg between the mobile station and the interworking function,

establishing one common broadband traffic channel for all links of the multilink point-to-point connection on the subleg between the mobile station and the interworking function.

28. A method accroding to claim 25, **characterized** by

establishing a separate link access control (LAC) protocol link, such as a radio link protocol (RLP) link, for each link of the multilink point-to-point connection on the subleg between the mobile station and the interworking function,

establishing one common separate link access control (LAC) protocol link, such as a radio link protocol (RLP) link, for all links of the multilink point-to-point connection on the subleg between the mobile station and the interworking function,

multilexing the links of the multilink point-to-point connection inside the LAC protocol link.

29. A method according to ~~any one of claims 25 to 28,~~ Claim 25 **characterized** in that said multilink point-to-point connection uses a mutlilink point-to-point protocol PPP, and that each link of the multilink point-to-point link uses a point-to-point protocol PPP.